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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,207	01/15/2002	Hong Wan	P01,0367	5757

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EXAMINER
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EASTHOM, KARL D

ART UNIT	PAPER NUMBER
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2832

DATE MAILED: 10/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/047,207

Applicant(s)

WAN, HONG

Examiner

Karl D Easthom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-36 is/are pending in the application.
- 4a) Of the above claim(s) 18-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-17, and 31-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/22/02.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-8, 11-15, 31-33 and 36 are rejected under 35 U.S.C. 102(e) as anticipated by Daughton et al. Daughton discloses the claimed invention at Fig. 1A where the input strap is 26B, and the magnetoresistors are 23A-23D, with the fields in 23A and 23D opposite to those in 23B or 23C (see top of col. 20 also). The supply terminals and isolator outputs are the terminals of the bridge of magnetoresistors. For claims 3-5, 12, and 32-33, the turns of 29 meet the claim. For claims 4 and 11, the left-hand and right-hand sides of the coil meets the claim. Or also, see

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col. 18, lines 40-45, disclosing major portions of the coil of the input strap along the elongated portions. For claim 6, the layers are seen at Fig. 1A, while for claims 7-8, and 13-15, see the dielectric 27 at Fig. 2B, col. 18, line 10-25, and lines 55-65 (second dielectric). For claim 31, the tracking occurs due to the coil arrangement similar to that of applicant. Claim 36 follows from the elements noted. The silicon substrate is 11.

4. Claims 1, 3-6, 11-12, and 31-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Torok et al. Torok discloses the claimed invention at Figs. 3a or 5, with first and second isolator input terminals 306, 308, or 510, first and second isolator output terminals 310, 312, or at V, first through fourth magnetoresistors 302, or 502-508, and wherein the resistors are each coupled to the claimed terminals, with supply B having two terminals, and an input strap 304 or 510 producing magnetic fields in opposite directions in two of the magnetoresistors as simple application of the right-hand rule shows, meeting claim 2. That is, a DC current entering at 510 would produce an upwards magnetic field at the top two magnetoresistors, and a downwards field for that below. In claims 3 and 12, the plurality is seen. In claims 4-5, some elongated portions at Fig. 5 of the magnetoresistors are from left to right, since elongated does not require that portion be the longest portion of the magnetoresistors. . In claims 6 and 13, the input strap is in two different layers, each of which is different than the layer of the magnetoresistors. In claim 11, the strap portion 510 at Fig. 5 is alongside the length of 502 and 504 at the top from the left end to the right end of the isolator, while the strap portion of 510 on the bottom extends in the opposite direction only along the length of 506 and 508, where a length is the shorter bent portions. The lengthwise direction is the length along the shorter sides. For claim 12, there are several turns. In claim 31, the resistance in each changes so that there is tracking. In claims

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32-33, the turns at the end run along a length where a length is the longest part, and run along a length at least at the ends.

5. Claims 1, 3-17, and 31-36 are rejected under 35 U.S.C. 102(b) as anticipated by Wan or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wan in view of either Torok et al. or Daughton et al. Wan discloses the claimed invention at Fig. 1 where the input strap is strap 54, and the magnetoresistors are 24-30. The supply terminals and isolator outputs are the terminals of the bridge of magnetoresistors. That is, while the input strap 54 is described as a reset strap, it still meets the claim since it can function as an input strap as it is isolated, and also produces fields in 28, 30 opposite from that of 24, 26. The elongated portions of claims 4-5 are at the top and bottom of Fig. 2. In claims 9-10, 16-17, and 34-35, the reset coil is the coil 72, 74 having the portions claimed. In claims 11 and 32-33, the first and second portions are the portions under the different magnetoresistors. They run alongside a length where a length is any finite portion. Or the portions of the coil 54 to the left and right of the magnetoresistors at Fig. 1 run along the length of those resistors if the length is taken to be the longest portions thereof. They run to the top and bottom or left and right hand ends of the isolator. For claim 11, the two portions of at least one turn have current opposite in the different resistors 24 and 28, for example. Finally note that Fig. 1 of Wan is remarkably similar to Fig. 4 of applicant's specification. It appears that there are some structural differences between the input strap 54 of Wan and 70 of applicant, but applicant has the burden to explain the difference in terms of how the claims are not met by the input strap 54 of Wan. (Note too the discussion of Pant '590, where that "set/reset" strap is similar to that of Wan and isolates as noted.) For claim 31, "tracks" is a broad term, and the resistors each change to a maximum value when a pulse occurs

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due to the fields generated in the input coil so that there is a tracking. Since the setup is the same as that of applicant, there would appear to be tracking via a DC current also due to the vector sum of fields appearing. If this were not so, a pulse would not be required for setting/resetting. For claim 1 and 36, see also Fig. 1a, the semiconductor substrate is 100 with the input strap 60 (set/reset) above same, and dielectric 104, while the first and second magnetoresistors are on one side of the device, across the center, with the other two on the other side, so that the fields are generated toward the center and opposite as claimed. As an alternative, where applicant argues that the Wan set/reset strap cannot be used as an input strap, the input strap 70 and remaining elements of Wan as noted above disclose the invention except the opposite fields produced by the input strap in two magnetoresistors. Torok discloses such a strap such as 510 at Fig. 5. It would have been obvious to modify the strap 70 of Wan to create opposite fields which is simply obtained by changing current directions which is a well known result of the right-hand rule known to first year physics students, where Torok discloses that same is useful for a signal isolator similar to that of Wan. For claim 11, and all other claims the strap 70 as modified would meet the claims essentially as noted above with respect to strap 54. The strap for example 70, traverses from end to end of the device. As further suggestion, Wan discloses how to create opposite fields in magnetoresistors with a planar strap, such as that of strap 54. Daughton discloses oppositely magnetized sets of resistors at Fig. 1A for a similar purpose, noting at col. 20 that such an arrangement provides a differential output, maximizing the signal output or gain, so that it would have been obvious to employ in a signal isolator having a Wheatstone bridge arrangement like that of Wan.

6. Claims 1, 3-7, 31-33 and 36 are rejected under 35 U.S.C. 102(b) as anticipated by Pant '590. Pant discloses the claimed invention at Fig. 5 where the input strap is S, and the magnetoresistors are R1-R4. The supply terminals and isolator outputs are the terminals of the bridge of magnetoresistors. The input strap s as an input strap as it is isolated from the outputs of the magnetoresistors, and changes the transfer function and resistance of the resistors as noted at col. 3 so that the isolated output varies if a current is supplied, meeting claims ~~2~~ and 31. In claims 1 ~~2~~ the fields are opposite as claimed, where "across" is a broad term. For claim 3, Fig. 5 discloses the strap under the magnetoresistors R1-R4. For claims 4-5 and 32-33, the elongated portions of the strap are not necessarily contagious, but one portion is at the top and bottom over R1 and R3,. In claims 6-7, see the dielectrics of SiN at Fig. 3c, which would be employed in the Fig. 5 arrangement. For claim 11, the turns of S go from a left end to a right end of the strap. For claim 1 and 36, the semiconductor is the Si with the input strap (set/reset) above same, and dielectric of SiN, the first and second magnetoresistors are on one side of the device, across the center, with the other two on the other side, so that the fields are generated toward the center and opposite as claimed.

7. Claims 7-10, 14, 17, and 34-36 are rejected under 35 U.S.C. 103(a) as obvious over Wan in view of Torok et al. Wan discloses the claimed invention essentially as noted above, except here, the input strap is 70 which does not produce opposite fields in two magnetoresistors. Torok et al. Discloses that arrangement at Fig. 5

8. Claims 7-10, 14, 17, and 34-36 are rejected under 35 U.S.C. 103(a) as obvious over Torok et al. in view of Wan. Torok discloses the invention as noted above except for the dielectric and reset/straps. Wan discloses at col.1, lines 30-60, and Fig. 1 a set/reset strap 54,

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that is essential in order for repeatability, and also for testing, setup, calibration, and compensation, meeting the claims, for magnetoresistors such as that of Torok at Fig. 5, so that it would have been obvious to employ the straps. Wan discloses dielectric layers 102, 104, and 106 at Fig. 1a for the purpose of providing small devices at col. 1 so that it would have been obvious to form such layers, where col. 4, lines 35-50 discloses varying relative locations of the layers so that such a variation employed with Torok would have been obvious.

9. Claims 7-8, 10, 14, 17, and 34-35 are rejected under 35 U.S.C. 103(a) as obvious over Torok et al. in view of Pant. '278. Torok discloses the invention as noted above except for the dielectric and set/reset strap. Pant discloses at Figs.2-5 a set/reset strap and also dielectric layers, for testing, setup, calibration, and compensation, meeting the claims, for magnetoresistors such as that of Torok at Fig. 5, so that it would have been obvious to employ the straps. That is, Pant discloses at col. 1 that such testing, calibration was in the past done by coils, which would be required by the Torok device, so that it would have been obvious to employ buried coils in dielectric layers to form a compact self-contained device as stated at col. 1 (see the bottom thereof).

10. Applicant's arguments filed 9/20/4 and are moot or are persuasive only as to the removed rejections. Applicant argues that Torok does not disclose the claimed relationship along first and second GMR films, but does along other numbered magnetoresistors. Applicant assigns "first" and "second" in a fashion to avoid the art but this does not appear helpful since any one of the resistors can be called, first, second, etc., where all are "coupled" to the various inputs argued. Applicant attempts to assign first, second etc., by arguing that the magnetoresistors are not "coupled" in the manner claimed. This is not true. All the



magnetoresistors are coupled to each part of the circuit, as coupled is a broad term. As to claim 11, applicant argues that the current must run between the first and second ends in one direction. See the new remarks for Torok Fig. 5 meeting this interpretation, incorporated here by reference for brevity.

11. Applicant argues previously with regard to Wan, and provides a declaration with similar argument, that the set/reset strap 54 of Wan is not recognized by those of skill as a “useful” input isolator. However, it is respectfully asserted, that the issue is whether a signal at the input of the set/reset strap causes a change in the bridge output. To this question, applicant states on page 37 that “one skilled in the art would not so understand”, quoting his Declarant. Thus, it must be taken to be true that a signal at the input of the set/reset strap changes the bridge output. There is no direct assertion or evidence presented otherwise. There is no question, by evidence cited, that some signal at the input will produce some signal at the output. Wan at col. 3, lines 28-45, states “[w]ith a current entering pad 56 and leaving at pad 58, the current in segments 60 will cause a magnetization in elements 28 and 30 towards a central part of die 20. When a current is reversed ...[the field is reversed]”. This is an isolator. Applicant’s Declarant states it is not a “useful” isolator. This of course depends on the term “useful”, and is tantamount to another admission that it is an isolator. A current change in the input [set/reset strap 54 of Wan ] changes the field in the magnetoresistors, thereby changing the bridge output. That is why the strap is there, to change or null the bridge output offset. This part is agreed upon. Any such strap is an isolator in the broad sense of the term. This is also evidenced by the ‘278 patent to Pant as (acknowledged by applicant as cited by Wan at col. 1) at the top col. 5, whereat there are different measurement outputs produced at the output pads 26, 30 for example

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as a result of inputs to the set/reset strap. To this applicant argues at page 32 that the “Pant ‘278 .....strap is not used as an input strap”. This, as noted, ignores the issue, which is repeated - can it so be used ? Also, as noted above, Pant ‘590 reveals that the set/reset (input) straps do alter the transfer function, meeting the claim. As to the ‘278 patent, applicant agrees that an offset is eliminated. That elimination is an output. Simply put, without a current, there is a different output than with one at the set reset/ input straps, meeting the claims. The Declaration provides no factual support otherwise. Primarily, it pointedly ignores the statements by the Examiner and evidence in Wan that a current at the set/reset strap, provides an output in the bridge, that is different than would otherwise appear without the input to that strap. Thus, a DC signal or pulse, which resets the resistors in the insensitive direction as stated in the Declaration, creates a different resistance in the magnetoresistors that is a direct result of the DC signal or pulse, thus isolating the signal in the manner claimed. This would be useful to isolate a DC signal or pulse from the bridge circuit. Applicant’s declarant has not addressed this contention, nor has applicant’s representative, other than to state it is not useful or the term is overly broad. Applicant states at page 37 that “one skilled in the art would not so understand”. Applicant is stating that his Declarant does not understand what Pant ‘278 proves, that the signal at the set/reset strap creates a signal at the bridge. At page 42, applicant argues that Pant ‘278 “disclose no such thing”. This is not correct, and is directly contradicted by the Pant disclosure at col. 5, to wit: “[t]he difference between the first and second measurements is representative of the magnetic field component along the sensitive axis”. Perhaps the set/reset strap of Wan cannot do what the input strap as disclosed by applicant can do, but such is not claimed, and applicant addresses not what is broadly claimed, other than to argue that the Examiner is being

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overly broad. The declarant's statement is taken to mean that the Wan device cannot function as an isolator as he defines it, but not as broadly defined. That is, isolator is a broad term, and the declarant fails to address the broad interpretation by the Examiner. Why is it not useful? Is it the S/N ratio? There is no basis or factual support as to what is meant as not useful. Because evidence in Wan and Pant indicate that there are two separate bridge outputs for two opposite DC inputs to the set/reset strap of Wan (input strap of the claim), as noted above, this would indicate a very useful isolator. This must be addressed. Applicant points to no cognizable structural difference between the input strap of the claim and the strap 54 of Wan. Applicant argues that there is no input at the set/reset strap of Wan, but this is clearly not correct, because the set/reset signal is a clear input. As to the argued distinction of fields in two of the magnetoresistors not in the opposite directions in Wan, this is not correct. One is toward the center of the device, the other opposite to that, directly contrary to applicant's stated assertions otherwise.

12. As to claim 11, and Wan and Pant, note the response above, "alongside" and "portions" create ample broad room to read the limitations on the devices of the prior art. Applicant argues that the current is not carried between ends of the isolator. This is not correct. It is carried from the top to the back end. As to not running alongside, this is not correct. The tops and bottoms of the strap run alongside the longest portions, while the right and left side are alongside the shorter sides. Further, as to Pant, "coupled" is a broad term, and all resistors are coupled to the various inputs argued. In claim 36, the first and second magnetoresistors are on one side of the device, across the center, with the other two on the other side, so that the fields are generated toward the center and opposite as claimed.

13. Applicant further responds that the definition of the examiner is overly broad. This is not correct. Applicant supports his argument by stating that the issue is not whether the set/reset strap can isolate a signal, but whether one of skill would recognize that it could. This is tantamount to saying that the issue is not whether the device reads on applicant's claim, but whether applicant's declarant would recognize it as such. There is no such requirement. On the other hand, Applicant is essentially arguing that if one recognizes a new use for an old product, that he can rename parts of the old product with new names, and obtain a patent. As to what the Declarant recognizes, the Declarant states that the set/reset strap can create no signal at the bridge output because the set/reset strap would produce a field in the insensitive direction. This is in direct contradiction to what is of evidence of the file, and to what applicant tacitly admits otherwise. That is, the set/reset strap, while in the insensitive direction, does cause a change in the magnetoresistance, else it could not set/reset it, and this change in turn is seen at the output of the bridge.

14. As to Pant 590' applicant argues there are only two magnetoresistors.. This is not correct, please see Fig. 5 and disclosing magnetoresistors 120-123.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl D Easthom whose telephone number is (571) 272-1989.

The examiner can normally be reached on M-Th, 5:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karl D Easthom  
Primary Examiner  
Art Unit 2832

KDE